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(54) A combination padlock

(57) The padlock comprises a body (10) having an internal cavity (11) and a hook-shaped locking member (13) movable between closed, open and combination changeable positions. The locking member (13) has a short limb (13a) received in a recess (14) when the padlock is closed and a long limb (13b) provided with spaced blocking members (15). Sleeves (16) having stepped internal and external diameters are mounted on long limb (13b) and wheels (20) are mounted on the smaller external diameter portions of respective sleeves (16) and co-operate with the blocking members (15) to prevent movement of the locking member (13) from a closed to an open position except when the correct combination is set by the wheels (20) to bring slots (17) in sleeves (16) into alignment. The locking member (13) is moved to open position by setting the correct combination whereupon a spring (26) will urge the member (13) outwardly releasing limb (13a) from recess (14); the member (13) can then be moved angularly. To change the combination the locking member (13), when in an open position, is pushed linearly and the blocking members (15) will move the respective sleeves (16) to disengage teeth on sleeves (16) and teeth (21) on wheels (20) so that wheels (20) can be rotated to provide new combination - locking member is then released. Padlock can be manufactured in plastic material.

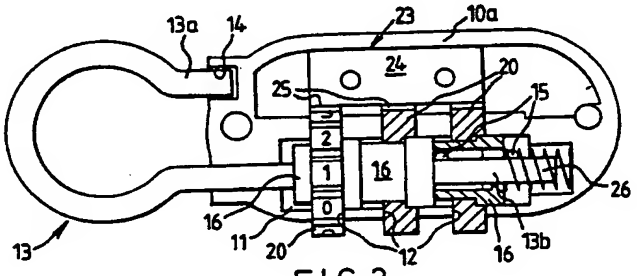

FIG.2.

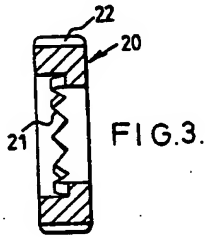

FIG.3.

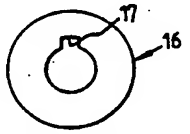

FIG.5.

The drawing(s) originally filed was (were) informal and the print here reproduced is taken from a later filed formal copy.

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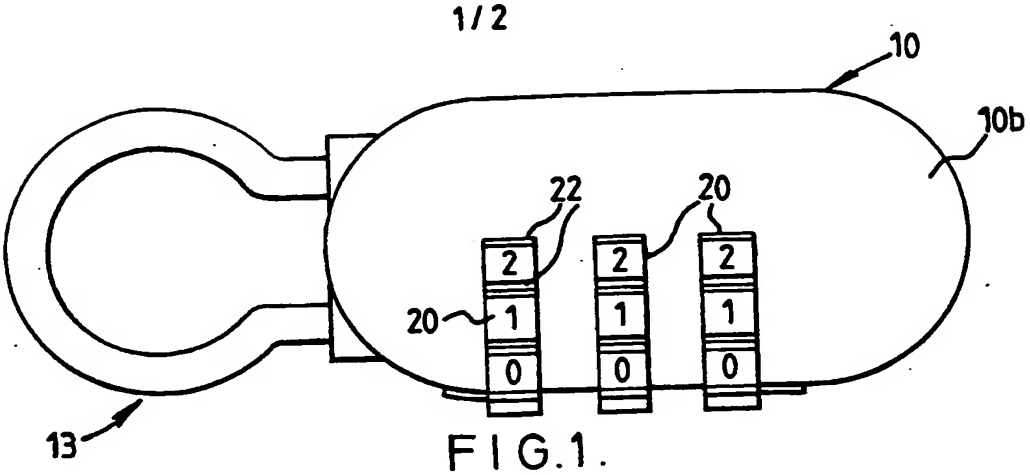

FIG.1.

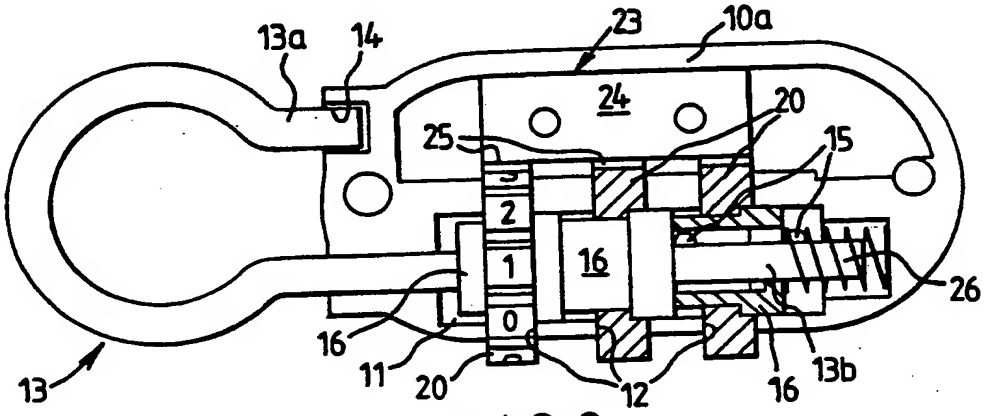

FIG.2.

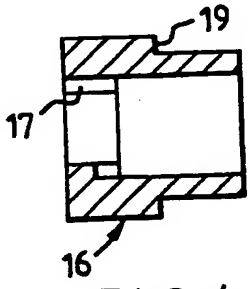

FIG.4.

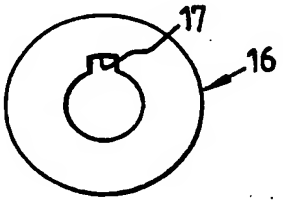

FIG.5.

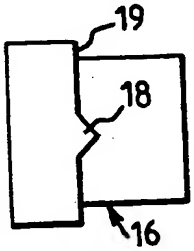

FIG.6.

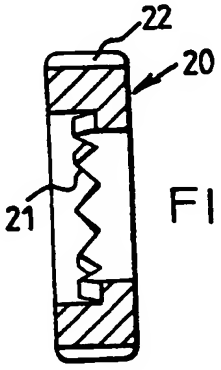

FIG.3.

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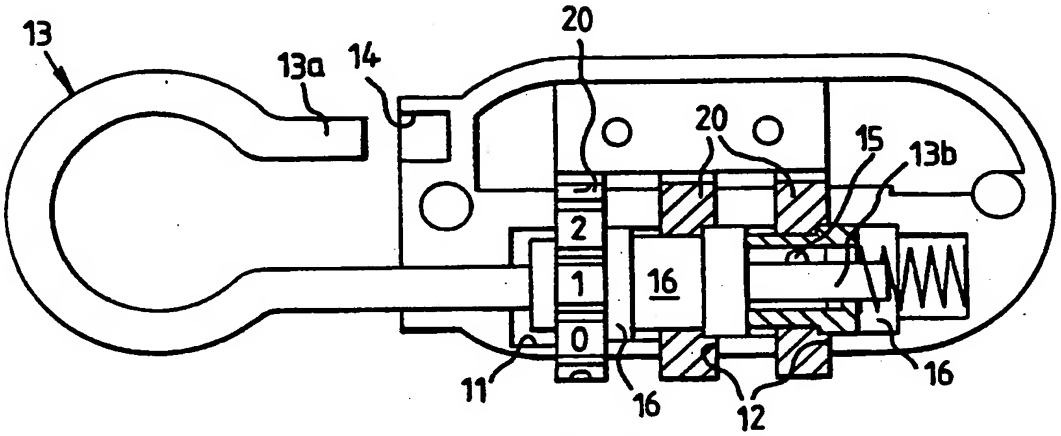

FIG.7.

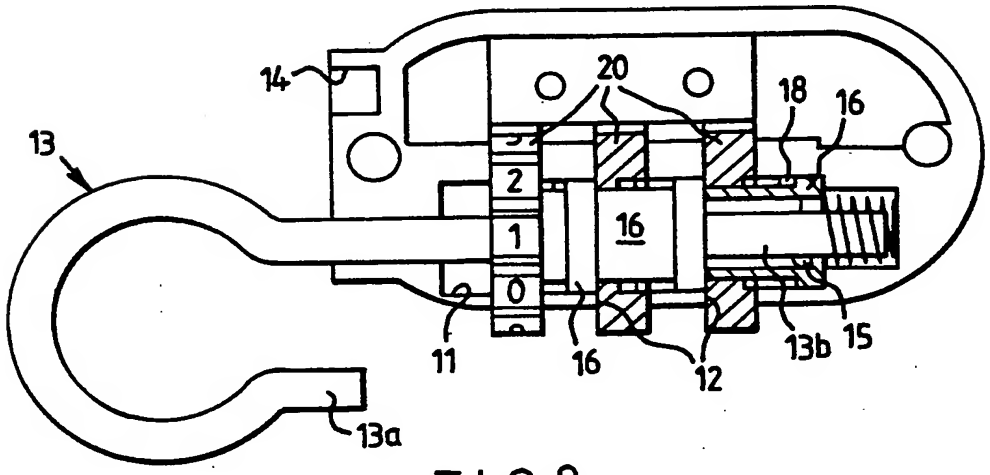

FIG.8.

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A combination padlock

This invention relates to a combination padlock and particularly to such a padlock in which the combination can be changed.

According to the invention there is provided a combination padlock comprising a body having an internal cavity, a hook-shaped locking member movable between closed, open and combination changeable positions and having a short limb receivable in a part of the body when the locking member is in a closed position and a long limb extending into the cavity and provided with a plurality of blocking members spaced apart in the direction of the longitudinal extent of the long limb, a plurality of sleeve members rotatably mounted on the long limb of the locking member within the cavity and co-operable with the blocking members to prevent movement of the locking member from a closed to an open position except when the sleeve members are each arranged in a predetermined angular position with respect to the body, and a plurality of wheels each mounted in a respective slot in the body and each keyed to a respective sleeve so that the sleeve is rotatable by

its respective wheel when the locking member is in a closed position, the locking member being movable from a closed to an open position by first turning each of said wheels to its said predetermined angular position and by subsequent linear and then angular movement about its long limb, and being movable from an open to a combination changeable position by linear movement of the locking member to release the keyed connection between the wheels and their respective sleeves.

Preferably, spring means are provided to urge the locking member towards a position in which the blocking members engage respective sleeves when the locking member is in a closed position, the locking member being movable from its open to its combination changeable position by linear movement of the locking member against the urging force of the spring means.

Conveniently, the blocking members are in the form of lugs which project outwardly from the long limb of the locking member and which are aligned in the direction of the longitudinal extent of the long limb and wherein the sleeves each have a slot, the slots being aligned with the blocking members when each sleeve is in its predetermined angular position.

Preferably, each sleeve or wheel has a ring of teeth which mates with at least one tooth on its respective wheel or sleeve to key the sleeves to respective wheels.

Advantageously, the wheels each have a plurality of circumferentially spaced notches, resilient detent means being provided to engage in said notches to define a plurality of discrete angular positions of each wheel.

The invention will now be more particularly described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 is a plan view of one embodiment of a combination padlock according to the present invention,

Figure 2 the view similar to Figure 1 with the upper part of the cover removed and parts shown in section,

Figure 3 is a section through one of the wheels of the padlock of Figures 1 and 2,

Figure 4 is a section through one of the sleeves of the padlock ,

Figure 5 is a view from the left hand end of the sleeve shown in Figure 4,

Figure 6 is a side elevation of the sleeve shown in Figures 4 and 5,

Figure 7 is a view similar to Figure 2 but with the locking member in a partially open position, and

Figure 8 is a view similar to Figure 2 but with the locking member in a combination changeable position.

Referring now to the drawings, the combination padlock shown therein comprises body 10 formed in two parts 10a and 10b. The body has an internal cavity 11 and three spaced slots 12 communicating with the cavity 11.

A hook-shaped locking member 13 has a short limb 13a and a long limb 13b, the latter extending into the cavity 11. The locking member 13 is movable between closed, open and combination changeable positions.

When in the closed position (shown in Figures 1 and 2) the short limb 13a is received in a recess 14 in the body 10, the base of the recess preventing further inward linear motion of the locking member 13. The long limb 13b extends into the cavity 11 and is provided with a plurality of spaced blocking members in the form of lugs 15 which extend outwardly from the long limb 13b and which are aligned in the direction of the longitudinal extent of the long limb 13b.

Three sleeves 16 are mounted on the long limb 13b of the locking member 13 for angular movement relative thereto. The sleeves 16 are arranged in end to end abutting relationship and as shown in Figures 4 to 6 have a stepped external diameter and a stepped internal diameter. The end of the sleeve which is of smaller internal diameter and larger external diameter has a slot 17 which extends radially outwards by a distance which corresponds to the difference between its larger and smaller internal radii. Each sleeve 16 also has two axially facing teeth 18 disposed diametrically opposite one another on a shoulder 18 between the larger and smaller external diameters.

Wheels 20 are accommodated in respective slots 12 and are mounted on the smaller external diameter portions of respective sleeves 16. Each wheel 20 has an internal axially facing ring of teeth 21 (see Figure 3) and a plurality of circumferentially spaced notches 22 in its outer periphery. Resilient detent means 23 comprising a plate 24 and three kinked spring leaves 25 is provided to define a plurality of discrete angular positions of each wheel 20, the kinks in the leaves 25 cooperating with the notches 22 in the wheels.

A compression spring 26 is provided within the cavity 11 to urge the locking member 13 towards a position as shown in Figures 1 and 2 in which the blocking members or lugs 15 engage respective sleeves 16.

When in the closed position shown in Figure 2 the teeth 18 on the sleeves 16 mate with teeth 21 on respective wheels 20 to ensure that the wheels 20 and respective sleeves 16 rotate in unison. Moreover, the locking member 13 is held in its closed position by engagement between the lugs 15 and respective sleeves 16.

In order to release the padlock and allow the locking member 13 to be moved to an open position the three wheels 20 are turned to a preset angular position by aligning the correct combination of the lock (using the roman numerals on the wheels) with a datum line or point in the body 10. This will bring the slots 17 in the sleeves 16 into alignment with each other and with respective lugs 15. The spring 26 will then urge the locking member 13 outwardly releasing its short limb 13a from the recess 14 (see Figure 7). The locking member 13 can then be displaced angularly.

In order to change the combination of the padlock, the locking member 13 when in an open position is pushed linearly to move the long limb 13b against the urging force of the spring 26. Because the locking member 13 has been displaced angularly from a position in which the lugs 15 are aligned with the slots 17 in the sleeves 16, the lugs will co-operate with respective sleeves to move the latter in a direction which disengages the teeth 18 from respective teeth 21 on the wheels 20 (see Figure 8). The wheels 20 can then be rotated freely to provide a newly chosen combination. Once the new combination is aligned with the datum line or point on the body

10, the locking member 13 is released and the spring 26 will return the locking member 13 together with its sleeves 16 to a position in which the teeth on the latter again engage teeth 21 on the wheels 20.

A combination padlock as described above is simple to manufacture and can be manufactured in plastic material.

The above embodiment is given by way of example only and various modifications will be apparent to persons skilled in the art without departing from the scope of the invention defined by the appended claims.

CLAIMS

1. A combination padlock comprising a body having an internal cavity, a hook-shaped locking member movable between closed, open and combination changeable positions and having a short limb receivable in a part of the body when the locking member is in a closed position and a long limb extending into the cavity and provided with a plurality of blocking members spaced apart in the direction of the longitudinal extent of the long limb, a plurality of sleeve members rotatably mounted on the long limb of the locking member within the cavity and co-operable with the blocking members to prevent movement of the locking member from a closed to an open position except when the sleeve members are each arranged in a predetermined angular position with respect to the body, and a plurality of wheels each mounted in a respective slot in the body and each releasably keyed to a respective sleeve so that the sleeve is rotatable by its respective wheel when the locking member is in a closed position, the locking member being movable from a closed to an open position by first turning each of said wheels to its said predetermined angular position and by subsequent linear and then angular movement about its long limb, and being movable from an open to a combination

changeable position by linear movement of the locking member to release the keyed connection between the wheels and their respective sleeves.

2. A combination padlock as claimed in claim 1, wherein spring means are provided to urge the locking member towards a position in which the blocking members engage respective sleeves when the locking member is in a closed position and wherein the locking member is movable from its open to its combination changeable position by linear movement of the locking member against the urging force of the spring means.

3. A combination padlock as claimed in claim 1 or claim 2, wherein the blocking members are in the form of lugs which project outwardly from the long limb of the locking member and which are aligned in the direction of the longitudinal extent of the long limb and wherein the sleeves each have a slot, the slots being aligned with the blocking members when each sleeve is in its predetermined angular position.

4. A combination padlock as claimed in anyone of the preceding claims, wherein each sleeve or wheel has a ring of teeth which mates with at least one tooth on its respective wheel or sleeve to key the

sleeves to respective wheels.

5. A combination padlock as claimed in anyone of the preceding claims, wherein the wheels each have a plurality of circumferentially spaced notches and wherein resilient detent means are provided to engage in said notches to define a plurality of discrete angular positions of each wheel.

6. A combination padlock substantially as hereinbefore described with reference to the accompanying drawings.

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